Subject: Recommendations for disposition of comments to the proposal for discrete gust design loads.

The Aviation Regulatory Advisory Committee (ARAC) submitted recommendations for the harmonization of the discrete gust design loads requirements to the FAA by letter dated October 15, 1993. The FAA concurred with the recommendations and proposed them in Notice of Proposed Rulemaking (NPRM) No. 94-29 which was published in the Federal Register on September 16, 1994, (59 FR 47756).

Comments were received by the FAA from foreign and domestic aviation manufacturers and foreign airworthiness authorities Many of these comments were supportive of the proposal, while some suggested substantive changes. The FAA tasked the ARAC Loads and Dynamics Working Group (LDHWG) by notice in the Federal Register (60 FR 18874, April 13, 1995) to consider the comments and provide recommendations for their disposition

In accordance with the assigned task the LDHWG has discussed the public comments and developed recommended dispositions. The comments and their dispositions have generally been grouped into the four categories listed below and are provided for use in responding to the public comments.

1) Supportive comments. Several commenters supported the proposal and recommended that it be promulgated as proposed

2) Editorial error in the formula for the design speed for maximum gust intensity V_B Several commenters correctly identified an editorial error in the formula for V_B and it has been corrected.

3) The criteria for establishing V_B is unconservative. One commenter believes that the new criteria for V_B is unconservative and could provide unrealistic margins above the stalling speed. The commenter suggests that the criteria of the current JAR-25 be used instead. The FAA disagrees. The commenter provided no data or other information that shows the new V_B calculations to be unrealistic. The new method for calculating the minimum V_B is approximately the same as in the current part 25 and JAR-25; the main difference being that the revised gust speeds are used in the calculation. These gust speeds are based on actual measurements in aircraft operation and are considered to result in a realistic and conservative V_B speed, even if it is somewhat lower than the current requirements at some altitudes. In addition, a new operational rough air speed, V_{RA} is provided in order to ensure adequate margins above the stalling speed while operating in rough air. As part of the effort to harmonize the airworthiness requirements, the JAA is proceeding with a proposal for calculating the minimum V_B speeds which is identical to the proposal in the Notice 94-29.

4) The discrete gust methodology can under predict design loads in some cases. One commenter suggested that the proposed tuned gust criteria does not fully account for the dynamic response of the airplane and therefore could produce unconservative gust design loads. The commenter suggested that the proposal be replaced by an entirely different method of accounting for discrete gusts. This method is known in the industry as the statistical discrete gust method (SDG). The LDHWG considered the commenters specific concerns and the alternate proposal in considerable detail. It is recognized by the working group that the current proposed tuned gust criteria has some limitations and that the suggested SDG method may have some promising features for predicting design gust loads. However, the SDG method is still in a developmental stage and there is currently no formally established industry process for using this method in predicting gust design loads. The FAA will retain the commenters proposal for additional study and possible consideration in future rulemaking actions. In response to this commenters specific concerns, neither ARAC nor the FAA agree that the tuned gust method will result in unconservative design loads. The commenter provided some comparisons of loads produced by the SDG method with the results of the proposed tuned gust method. These results were reviewed by the LDHWG and it was determined that they showed no significant differences in overall load levels when all factors were taken into account, and in some cases the SDG method could actually provide lower design loads. In addition, for establishing the overall design gust load level the proposed discrete gust criteria are complemented by the continuous turbulence criteria of Appendix G. For the longer gust gradient distances where the commenter questions the adequacy of the tuned gust method to fully account for dynamic response, the FAA believes that the additional criteria for continuous gusts directly compensates for any potential deficiencies in the discrete gust criteria of § 25.341(a).

In conclusion, except for a minor editorial change in the formula for V_B, the Aviation Regulatory Advisory Committee recommends that the FAA proceed with the rule as published in the NPRM.